



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,241	10/03/2003	Hideyuki Sakaida	Q77625	9108

23373 7590 03/27/2007
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

SMITH, JEFFREY S

ART UNIT	PAPER NUMBER
----------	--------------

2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/677,241	Applicant(s) SAKAIDA, HIDEYUKI	
	Examiner Jeffrey S. Smith	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Requirement For Information

1. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application. The information is required to document the level of skill and knowledge in the art of phase contrast imaging.

2. In response to this requirement, please provide answers to each of the following interrogatories eliciting factual information:

The amendment filed March 8, 2007 ("amendment") states that the "Examiner asserts that Gureyev discloses ... 'plural sets of detection data obtained by detecting intensity of radiation on plural detecting planes at different distances for the object,' as claimed." The applicant then states that "the Examiner's assertion is not correct and the rejection must fail." Is applicant alleging that plural sets of detection data obtained by detecting intensity of radiation on plural detecting planes at different distances for the object are in fact unknown in the prior art? Is the inventor or the assignee of record aware of work by another performed before October 3, 2003 that includes plural sets of detection data obtained by detecting intensity of radiation on plural detecting planes at different distances for the object? If such work by another is known to the inventor or the assignee then disclose this information in an information disclosure statement. If such information has previously been disclosed by the applicant or in a reference listed

in the PTO-892, then identify the reference, page and line number that shows this information. Has applicant or the assignee of record filed any applications in this or a foreign country that disclose or claim plural sets of detection data obtained by detecting intensity of radiation on plural detecting planes at different distances? If so, please disclose these applications. Has this Office or a foreign Office ever rejected any claims filed by the assignee that include plural sets of detection data obtained by detecting intensity of radiation on plural detecting planes at different distances? If so, please disclose the rejections.

The amendment states that the "Examiner also asserts that Gureyev discloses at page 357 'obtaining differential data representing a difference between first and second sets of detection data.'" The applicant then states that "Gureyev is wholly inadequate to form a basis for obviousness of the claimed invention" because inter alia, "there is no consideration of different distances and, thus, no consideration of first and second data, as defined in the claims." Is applicant alleging that obtaining differential data representing a difference between a first set of detection data and a second set of detection data is in fact unknown in the prior art? Is the inventor or the assignee of record aware of work by another performed before October 3, 2003 that includes obtaining differential data representing a difference between a first set of detection data and a second set of detection data? If such work by another is known to the inventor or the assignee then disclose this information in an information disclosure statement. If such information has previously been disclosed by the applicant or in a reference listed in the PTO-892, then please identify the reference, page and line number that shows

Art Unit: 2624

this information. Has applicant or the assignee of record filed any applications in this or a foreign country that disclose or claim obtaining differential data representing a difference between a first set of detection data and a second set of detection data? If so, please disclose these applications. Has this Office or a foreign Office ever rejected any claims filed by assignee that recite obtaining differential data representing a difference between a first set of detection data and a second set of detection data? If so, please disclose the rejections.

The amendment states that with "apparent reference to steps (c) and (d)...the Examiner further asserts that the obtaining of Laplacian of phase and obtaining phase data by performing inverse Laplacian computation is taught at pages 357 and 360." The amendment then states that "Applicants would disagree...." Is applicant alleging that obtaining Laplacian of phase on the basis of differential data and any one of plural sets of detection data is in fact unknown in the prior art? Is the inventor or the assignee of record aware of work by another performed before October 3, 2003 that includes obtaining Laplacian of phase on the basis of differential data and any one of plural sets of detection data? If such work by another is known to the inventor or the assignee then disclose this information in an information disclosure statement. If such information has previously been disclosed by the applicant or in a reference listed in the PTO-892, then please identify the reference, page and line number that shows this information. Has applicant or the assignee of record filed any applications in this or a foreign country that disclose or claim obtaining Laplacian of phase on the basis of differential data and any one of plural sets of detection data? If so, please disclose these applications. Has this

Office or a foreign Office ever rejected any claims filed by assignee that recite obtaining Laplacian of phase on the basis of differential data and any one of plural sets of detection data? If so, please disclose the rejections.

Also, is the applicant alleging that obtaining phase data of the radiation by performing inverse Laplacian computation on the Laplacian of phase is in fact unknown in the prior art? Is the inventor or the assignee of record aware of work by another performed before October 3, 2003 that includes obtaining phase data of the radiation by performing inverse Laplacian computation on the Laplacian of phase? If such work by another is known to the inventor or the assignee then disclose this information in an information disclosure statement. If such information has previously been disclosed by the applicant or in a reference listed in the PTO-892, then please identify the reference, page and line number that shows this information. Has applicant or the assignee of record filed any applications in this or a foreign country that disclose or claim obtaining phase data of the radiation by performing inverse Laplacian computation on the Laplacian of phase? If so, please disclose these applications. Has this Office or a foreign Office ever rejected any claims filed by assignee that recite obtaining phase data of the radiation by performing inverse Laplacian computation on the Laplacian of phase? If so, please disclose the rejections.

3. In response to this requirement, please state whether any search of prior art was performed. If a search was performed, please state the citation for each prior art collection searched. If any art retrieved from the search was considered material to

Art Unit: 2624

demonstrating the knowledge of a person having ordinary skill in the art to the disclosed method of restoring phase information, please provide the citation for each piece of art considered and a copy of the art.

For example, if a search was performed by the Japanese patent office for the corresponding Japanese application, please submit a copy of the Japanese search results. If a rejection was made in the corresponding Japanese application, please submit a copy of the Japanese rejection. If this application has a corresponding application filed in any other country, please submit the search and examination reports from those countries. For example, if this invention was filed in Europe, please submit a copy of the European search report and any Office actions made by a patent office in a European country.

4. This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Priority

5. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file. However, applicant cannot rely upon the foreign priority papers to overcome prior art published between October 4, 2002 and

October 3, 2003, because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Specification

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

7. The disclosure is objected to because of the following informalities. The reference numbers of figure 3 must be included in the specification, along with an identification and discussion of the elements that correspond to the reference numbers. In other words, the numbers must be included in the detailed description because the numbers have to refer to the elements in the drawings, hence the phrase reference numbers. Appropriate correction is required.

Claim Rejections - 35 USC § 101

8. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 5 and 6 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims fail to recite that the computer readable program is stored in a computer readable medium. The phrase a "program product containing a computer readable program" should be a "computer readable medium storing a computer readable program."

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Hard x-ray quantitative non-interferometric phase-contrast imaging" by Gureyev et al., SPIE vol. 3659, February 1999, pp. 356-364 ("Gureyev") in view of U.S. Patent No. 6,404,848 issued to Ishisaka et al. ("Ishisaka").

For claims 1, 3 and 5, Gureyev discloses "plural sets of detection data obtained by detecting intensity of radiation on plural detection planes at different distances from the object, said plural sets of detection data representing image information on the plural detection planes." (See abstract, "the appropriate processing of phase-contrast images obtained in the in-line geometry." See also Figures 1 and 2 and page 361 "We then computed the free-space propagation (calculating the full Kirchhoff integrals) of that complex amplitude from the plane $z=0$ to $z=0.15m$." Applicant also admits that this feature is prior art. Page 17 of the application admits that "even if phase information is obtained by using plural sets of detection data having non-uniform blur amounts as in a conventional method...." Presumably the conventional method is Gureyev.)

Gureyev discloses "obtaining differential data representing difference between first detection data and section detection data of said plural sets of detection data."

(See page 357, "processing of the differential images.")

Gureyev discloses "obtaining Laplacian of phase on the basis of said differential data and any one of said plural sets of detection data." (See equation 3a on page 357).

Gureyev discloses "obtaining phase data of the radiation by performing inverse Laplacian computation on the Laplacian of phase." (See page 360 "There are many well-known methods for solving equations of the type (2) and (3)").

Gureyev does not disclose "correcting blur amount."

Ishisaka discloses "correcting blur amount." (See column 4 lines 24-29, "by making the edge enhancement described above generate simultaneously, this blur is eliminated").

It would have been obvious to one of ordinary skill in the art at the time of invention to include the blur correction of Ishisaka with the phase-contrast imaging of Gureyev, because, by eliminating the blur, a "radiographing image having the excellent sharpness is obtained," as taught by Ishisaka at column 4 lines 24-29.

For claims 2, 4 and 6, Ishisaka discloses that the blur is "caused by a focal size of a radiation source." (See column 7, lines 31-34 "when the size of the focal spot is increased...the blur width B due to the penumbra is increased"). Ishisaka further discloses that the blur is corrected by "uniforming blur amounts...on the basis of respective blur functions." (See blur functions shown by equations 1-4 in columns 4-6.

When the blur functions are applied to multiple images, the blur corrections are "uniform" because the blurs are eliminated, as discussed in column 4 lines 24-29).

Response to Arguments

Applicant's amendments to the drawings have overcome the objection to the drawings, however, the changes to the drawings must be reflected in the specification as discussed above.

Applicant's amendments to the specification are incomplete because they fail to reflect the changes to the drawings as previously discussed.

Applicant's amendments to the claims have overcome the objections to the claims.

Applicant's amendments to the claims have overcome the rejections based on 35 U.S.C. 112, second paragraph.

Applicant's amendments to the claims have failed to overcome the rejections based on 35 U.S.C. 101 as discussed above.

Applicant has failed to overcome the rejection under 35 U.S.C. 103. Applicant's arguments filed March 8, 2007 have been fully considered but they are not persuasive.

Applicant argues that Gureyev does not disclose plural sets of detection data, Page 17 of the application admits that obtaining phase information using plural sets of detection data is a conventional method, which meets the claim. The Examiner presumes that Gureyev discloses this admitted prior art. If the admitted prior art is

disclosed in another reference then applicant must identify and submit the reference as discussed in paragraphs 1 through 3 of the requirement for information.

Applicant argues that Gureyev, which discloses a method of restoring phase information using phase contrast imaging, does not disclose blur correction. However, blur correction for phase contrast imaging is disclosed by Ishisaka. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Ishisaka, which discloses blur correction, does not disclose using blur correction in the specific steps of phase contrast imaging. Applicant further argues that Ishisaka does not teach that Gureyev should be modified to consider correction of blur. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Ishisaka discloses phase contrast imaging that uses blur correction at column 6 lines 12-19. Also, the blur problem that is discussed by the background section of Ishisaka is the same problem that is discussed in the background section of the application as filed.

Art Unit: 2624

Furthermore, the solution given by Ishisaka is a solution for blur correction in phase contrast imaging as discussed in the summary.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Akira Ishisaka et al., in *A New Method of Analyzing Edge Effect in Phase Contrast Imaging with Incoherent X-rays*, disclose that "Phase contrast X-ray imaging can be performed ... by in-line method (citing work done by Gureyev)," which "takes into account the blur (abstract)."

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2624

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Smith whose telephone number is 571 270-1235. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSS
March 19, 2007

JINGGE WU
SUPERVISORY PATENT EXAMINER

